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INFORMATIVE POSSIBILITIES OF SCANNING ELECTRON MICROSCOPY TO DETERMINE PREMORTAL CHARACTER AND DURATION OF SKIN WOUNDS

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Confirmation of premortal character of skin wounds (SW), especially determination of their duration and time of existance, is a common question for forensic-medical practice. In order to find a better way of solving this problem we carry out an experimental study of skin cuts on guinea-pigs in different time periods after their performence. A scanning electron microscopy (SEM) is applied in our assay. Prevailing erythrocytes without any fibrin production are found on the surface of SW performed just before killing the animals. Fine, tender, film-like fibrin set is registered on the cut surface only in single zones (fig. 1). Widespread fine fibrin set with numerous erythrocytes, thrombocytes and individual T-lymphocytes with fine fibrin filaments can be seen on the surface of SW performed 30 min before killing the animals (fig. 2). Rather bigger number of lymphocytes and leukocytes among fine fibrin set (closer in structure to that of SW with shorter premortal period) is established in cuts performed longer time before death.

Fig.1 SEM of SW surface of guinea-pig. Fine fibrin set could be seen in some wound surface zones. x 2000; Fig.2 SEM of SW surface of guinea-pig 30 min prior to death. Many fine fibrin filaments connect erythrocytes to fibrin set. x 4000

Fine fibrin set with rougher filament structure in some wound

zones, together with erythrocytes and thrombocytes, could be detected in SW performed in early hours after death. Filament fibrin accumulations, though scarce, are registered on wound surface about 24 h after killing the animals. Rare blood cells are with free surface. Surprisingly early vital signs of different stages of fibrin production on wound surfaces could be found by SEM giving a tridimensional image of the object. From the other hand, the differences of fibrin set structure allow to determine the duration of SW. Ten h prior to death, erythrocytes without surface defects can be established on cut wounds of experimental guinea-pigs.

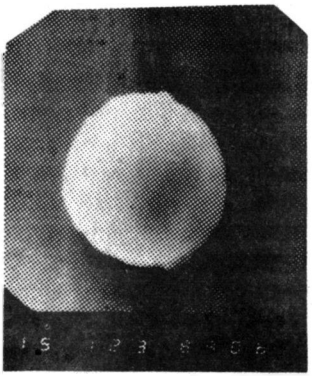

Fig.3 SEM of preparation from SW surface 24 h before death. Normal T-lymphocyte. x 12000; Fig.4 SEM of separeted white blood cells. Normal B-lymphocytes. A cell is similar to T-lymphocyte. x 6000

Fine filament fibrin threads are found on SW surface. Lymphocytes are also without visible disorders but SW are performed 24 h before killing the animals (fig. 3). No changes of the normal appearance of T- and B-lymphocytes separeted from guinea-pig blood left at room t^{o} for 6 h are detected. Also unchanged visible T- and B-lymphocytes from a suspension left 24 h at room t^{o} are found; however, one lymphocyte, similar to a T-cell, has a swelling-like buds on its surface (fig. 4). They could be accepted as a result of cell "aging" outside of living matter and conditions. If no changes of lymphocytes taken from the wounds' surface are found after a similar period of time prior to death, it could be suggested that SW surface is not a "dead" zone (as major number of authors presume) and provides much better conditions for cells. By using SEM we suggest that SW surface could provide enough information about premortal character of the cut wound as well as its duration.